

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A diagnostic device for diagnosing a programmable logic device that is embedded within an electronic system, the diagnostic device comprising:

an access controller configured to be embedded within an electronic system and for communicating to a programmable logic device embedded therein; [[and]]

a diagnostic control module configured to be embedded within an electronic system and transmitting diagnostic signals via the access controller to the programmable logic device where the diagnostic signals are received from a network in response to a diagnostic request, the diagnostic control module including logic for collecting output signals generated by the programmable logic device in response to the diagnostic signals, and the output signals serving to diagnose the programmable logic device; and

a reconfiguration control module coupled to the access controller for reconfiguring the programmable logic device based on output signals generated by the programmable logic device.

2. (Original) The diagnostic device as set forth in claim 1 wherein the access controller includes logic for communicating to the programmable logic device to control boundary scan logic within the programmable logic device.

3. (Original) The diagnostic device as set forth in claim 1 wherein the diagnostic signals include signals for performing boundary scan tests.

4. (Original) The diagnostic device as set forth in claim 1 wherein the diagnostic signals include boundary scan signals for causing the programmable logic device to drive stimulus signals to one or more neighboring devices within the electronic system.

5. (Cancelled)

6. (Currently Amended) The diagnostic device as set forth in claim 1 [[5]] wherein the reconfiguration control module includes logic for reconfiguring the programmable logic device to function as a test stimulus device that generates stimulus signals for testing one or more neighboring devices.
7. (Original) The self-contained electronic device as set forth in claim 6 wherein the reconfiguration controller further includes logic for reconfiguring another programmable logic device within the self-contained electronic device to act as a test result capture device to capture signals outputted from the one or more neighboring devices in response to the test stimulus signals.
8. (Original) The diagnostic device as set forth in claim 1 further including a network communication interface for communicating to a network and receiving the diagnostic signals therefrom, and wherein the diagnostic control module includes logic for transmitting the output signals to a remote diagnostic device for analysis via the network communication interface.
9. (Original) The diagnostic device as set forth in claim 1 wherein the diagnostic signals are received from a remote diagnostic device in communication with the system.
10. (Original) The diagnostic device as set forth in claim 1 wherein access controller includes logic for communicating to the programmable logic device in compliance with IEEE Standard 1532.
11. (Original) The diagnostic device as set forth in claim 1 wherein the diagnostic device is a microprocessor configured to be embedded within an electronic system.
12. (Original) The diagnostic device as set forth in claim 1 wherein the diagnostic device is a programmable logic device reconfigured within an electronic system to include the access controller and the diagnostic control module.

13. (Currently Amended) A self-contained electronic device comprising:  
a plurality of components selectively connected to each other to perform selected functions, the plurality of components including a programmable logic device;  
a network communication interface for communicating to a network;  
logic for receiving diagnostic commands from a remote diagnostic device in communication with the network communication interface; and  
a diagnostic controller embedded within the electronic device and in communication with the programmable logic device, the diagnostic controller including:  
a diagnostic control module for performing a diagnostic test on the programmable logic device in accordance with the diagnostic commands; and  
a reconfiguration controller in communication with the programmable logic device, the reconfiguration controller including logic for reconfiguring the programmable logic device based on the diagnostic output signals.

14. (Original) The self-contained electronic device as set forth in claim 13 wherein the diagnostic commands include signals for performing a boundary scan test on the programmable logic device during the diagnostic test.

15. (Original) The self-contained electronic device as set forth in claim 13 wherein the diagnostic controller further includes logic for communicating to the programmable logic device to control boundary scan logic within the programmable logic device.

16. (Original) The self-contained electronic device as set forth in claim 13 wherein the diagnostic controller further includes logic for communicating to the programmable logic device in accordance with IEEE Standard 1532.

17. (Cancelled)

18. (Currently Amended) The self-contained electronic device as set forth in claim 13 [[17]] wherein the reconfiguration controller further includes logic for reconfiguring the programmable logic device to drive test stimulus signals to one or more neighboring device within the electronic device.

19. (Original) The self-contained electronic device as set forth in claim 18 wherein the reconfiguration controller further includes logic for reconfiguring another programmable logic device within the self-contained electronic device to act as a test result capture device to capture signals outputted from the one or more neighboring devices in response to the test stimulus signals.

20. (Original) The self-contained electronic device as set forth in claim 13 wherein the diagnostic signals include boundary scan signals for causing the programmable logic device to drive stimulus signals to a neighboring device within the self-contained electronic device.

21. (Original) The self-contained electronic device as set forth in claim 13 wherein the diagnostic controller includes logic for collecting diagnostic output signals generated by the programmable logic device in response to the diagnostic commands.

22. (Original) The self-contained electronic device as set forth in claim 13 wherein the diagnostic controller is one of a microprocessor and a reconfigured programmable logic device.

23. (Currently Amended) A method of diagnosing an electronic system comprising the steps of:

communicating over a communications network to a remote electronic system that includes an embedded diagnostic/reconfiguration controller for performing diagnostic tests within the electronic system, the electronic system further including a programmable logic device that is configurable;

transmitting diagnostic commands to the remote electronic system that cause the diagnostic/reconfiguration controller to perform diagnostic tests on the programmable logic device where the programmable logic device generates output signals in response thereto;

receiving the output signals from the remote electronic system over the communications network; [[and]]

analyzing the output signals to determine if errors exist in a functionality of the programmable logic device; and

transmitting reconfiguration commands to the remote electronic system causing the diagnostic/reconfiguration controller to reconfigure the programmable logic device based on the output signals analyzed.

24. (Original) The method of diagnosing as set forth in claim 23 wherein the analyzing includes comparing the output signals to predetermined signals in order to identify errors in the programmable logic device.

25. (Original) The method of diagnosing as set forth in claim 23 further including testing one or more neighboring devices connected to the programmable logic device by transmitting reconfiguration commands to the diagnostic/reconfiguration controller of the remote electronic system for reconfiguring the programmable logic device to drive test stimulus signals to the one or more neighboring devices.

26. (Cancelled)

27. (Original) The method of diagnosing as set forth in claim 23 wherein the transmitting diagnostic commands include transmitting boundary scan test signals.

28. (Original) The method of diagnosing as set forth in claim 23 wherein the transmitting diagnostic commands include transmitting commands that are compliant with IEEE Standard 1532.

29. (New) An electronic system, comprising:  
an electronic device;  
at least one programmable logic device (PLD) embedded in the device and including programmable memory cells with values that defined a logic function implemented by the PLD;  
a first memory embedded in the device and configured with configuration data of the programmable memory cells;  
a second memory embedded in the device; and  
a microcontroller embedded in the device and coupled to the at least one PLD and to the first and second memories, the microcontroller including a first interface adapted for communication via a network external to the device, and a second interface coupled to the at least one PLD and adapted for boundary scan input and output to and from the PLD, wherein the microcontroller is configured to execute first and second software modules, the first software module adapted to apply input signals to the at least one PLD responsive to diagnostic control received via the network and transmit output signals from the at least one PLD via the network, and the second software module adapted to store, responsive to reconfiguration control received via the network, configuration data received via the network in the second memory and reconfigure the PLD with the configuration data received via the network.
30. (New) The system of claim 29, wherein the second software module is further adapted to reconfigure, responsive to reconfiguration control received via the network, a first set of configurable logic resources of a PLD embedded in the device to function as a test stimulus signal generator in the device.
31. (New) The system of claim 30, wherein the second software module is further adapted to reconfigure, responsive to reconfiguration control received via the network, a second set of configurable logic resources of a PLD embedded in the device to capture states of signals input to the second set of configurable logic resources.

32. (New) A method for testing an electronic device, comprising:
- receiving diagnostic commands and reconfiguration commands via a network connection at a microcontroller embedded in the device;
  - executing a first software module in response to receipt of the diagnostic commands, and in executing the first software module applying input signals to at least one PLD embedded in the device and transmitting output signals from the at least one PLD via the network;
  - storing in a first memory embedded in the device a current configuration data set consistent with states of programmable memory cells that define a logic function implemented by the at least one PLD; and
  - executing a second software module in response to receipt of a reconfiguration command, and in executing the second software module storing configuration data received via the network in a second memory embedded in the device and reconfiguring the PLD with the configuration data received via the network.
33. (New) The method of claim 32, wherein the input of signals to the at least one PLD and receipt of output signals from the at least one PLD is via a boundary scan interface.
34. (New) The method of claim 33, further comprising, reconfiguring, responsive to a reconfiguration command received via the network, a first set of configurable logic resources of a PLD embedded in the device to function as a test stimulus signal generator in the device.
35. (New) The system of claim 34, further comprising, reconfiguring, responsive to a reconfiguration command received via the network, a second set of configurable logic resources of a PLD embedded in the device to capture states of signals input to the second set of configurable logic resources.